GENDER BIAS IN POLICING

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

Gender Bias in Policing

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The rise in tension between law enforcement and the communities they serve and gender discrimination in general, brings importance to the study of statistical evidence of the presence of gender discrimination in different settings. Using detailed data on motor vehicle accidents between 2006 – 2012, we use as good-as-random variation in gender matches between officers and drivers to estimate the degree of gender bias. We do not find evidence of statistically significant levels of discrimination based on gender. The findings in this paper have important implications for both policies that shape the composition of police forces and police training programs.

CHAPTER I

INTRODUCTION

Policy makers are always concerned about potential discrimination in law enforcement. Tension between police departments and the public, especially minority communities, has been escalating since the acquittal of George Zimmerman in the death of unarmed teenager Trayvon Martin. A political movement, Black Lives Matter, whose goal is to unite African Americans within communities and to advocate for justice for victims of police brutality was born soon after. In response, current and former police officers started Blue Lives Matter – an organization to support law enforcement officers amidst the negative narrative from news organizations. Opposition and support for either group are largely driven by race, further igniting the racial divide. A recent poll found that 83% of African Americans view Black Lives Matter favorably while only 35% of whites share the same sentiment (Harvard Harris Poll, July 2017). Attitude towards police tactics also differ widely by race. While more than half of white survey respondents believe search and frisk policies reduce street crimes, over 80% of African Americans believe these policies result in more racial profiling (Harvard Harris Poll, 2017).

Recent empirical analyses show that there is evidence of disparities in the way minorities and whites are treated in the justice system. These studies suggest that in all facets of the criminal justice system, from treatment at initial contact with law enforcement (Fryer, 2016; West, 2018; Goncalves, 2018) to the length of criminal sentences (Mustard, 2001; Eren 2016), minority citizens are treated more harshly than their otherwise similar white peers.

In this paper, we observe a related situation where 50% of the population are females but 96% of the officers are male. Here, we may be concerned about potential gender discrimination.

A recent investigation by the Department of Justice's Civil Rights Division found that law enforcement agencies practice discriminatory policing, including gender discriminatory practices especially in investigations of crimes whose victims are predominantly females (DOJ, 2012). Forms of gender discrimination, in the context of sexual assault, arise from officers misclassifying or underreporting crimes of sexual assault, improperly conducting an investigation – often concluding the allegations are unfounded or not testing the sexual assault kit. Seeing the magnitude of this breakdown in law enforcement practices as evidence of these agencies failure to protect its' citizens, the Department of Justice released a guidance document to assist law enforcement agencies in identifying and preventing gender discrimination in their policing.

Using a unique dataset consisting of all motor vehicle accident reports between 2006 and 2012, this paper looks to answer whether evidence of gender discrimination exists. When an accident occurs, it is reported to a law enforcement agency either by the driver, a witness, or both. An officer is then dispatched to the scene of the accident where he/she serves as the investigating officer. After speaking with those involved, the officer decides the party at fault, if any, and issues citations accordingly. Once the investigation concludes, the officer fills out a detailed report based on the findings. Essentially, we have access to this thorough report. This environment offers an ideal setting to study such a question for multiple reasons. First, it provides detailed information recorded by the investigating officer who responded to the scene of the accident. This includes demographic characteristics of both the officer and the driver such as gender and race, years of experience for the officer and age of the driver. We also have access to a rich set of crash level details including road and weather conditions, number of vehicles involved and the outcome of the investigation – i.e. whether the driver received a citation.

Importantly, the officer concludes the investigation at the scene of the accident, and decides to issue citations, if any, while there. Therefore, this setting is free of any outside justice system influences that may play a role in an officers' decision to issue a citation. Because of the nature of traffic accidents and which officer is dispatched to the scene of an accident, the officer–driver pairing is as good as random. This key aspect, which we demonstrate to be true, allows us to make causal inferences in our study.

The paper is organized as follows: A brief review of the literature is covered in chapter 2, chapter 3 provides additional details about our dataset, our methodology is explained in chapter 4, results are discussed in chapter 5, and our conclusion follows in chapter 6.

CHAPTER II

LITERATURE REVIEW

The body of literature related to the topic of discrimination in law enforcement has been mainly focused on racial discrimination. Researches have studied this topic at every stage of the criminal justice system; from the initial interaction between officers and civilians, for instance - traffic stops, to the setting of bail, and the length of sentences. Gender discrimination, although largely discussed in relation to issues in the labor force, has been largely ignored in the law enforcement literature. In other fields, such as academia, recent studies suggest the existence of gender discrimination against women. In this paper, we hope to contribute to the literature of discrimination in law enforcement by providing new evidence in relation to gender discrimination.

Racial Discrimination in Law Enforcement

Recent studies suggest that officers are more lenient towards same-race drivers. Similarly stated, a driver who is exogenously assigned to an officer of a different race than their own is nearly 6% more likely to be cited than a driver who is exogenously assigned to an officer of the same race (West, 2018). There is also evidence suggesting that minority drivers are less likely than white drivers to receive a "discount" in the ticketed speed for a speeding citation. Speeding fines vary by the alleged speed of the driver, increasing at certain speeds above the posted limit. Officers often discount the charged speed of the driver to a speed right below the next increase in fine. Goncalves finds that white drivers are more likely than minority drivers to receive this discount in ticketed speed, even though there does not appear to be differences in driving behaviors between minority and white drivers.

Unrelated to traffic stops, Fryer finds that African Americans and Hispanics are roughly 18% and 12%, respectively, more likely to experience non-lethal use of force by a police officer relative to Whites.

Gender Discrimination in Other Fields

Recent studies have examined gender discrimination in other fields, like academia. Most notably, Wu explores a popular website among economists and finds that discussions about female economists focus on physical traits while discussions about male economists tend to focus on professional qualifications. In the classroom, female professors are given lower scores on student evaluations, especially male students, even though students perform equally as well in classes taught by male and female professors.

CHAPTER III

DATA

We use longitudinal data provided by a State Police Department from the years 2006-2012. These data include all motor vehicle accidents during the given time frame for which an officer in the police department was the investigating officer. Our dataset consists of 820,385 observations corresponding to 458,948 motor vehicle accidents. Each-driver officer interaction provides at least one observation to our dataset[1].

This detailed dataset consists of crash level information, officer and driver characteristics, and the outcome of the investigation. Our crash level variables include date, time, and location of the accident, as well as the number of vehicles involved, road, light, and weather conditions, and whether the crash occurred at an intersection or in a construction zone. Driver characteristics include age, race, and gender of the driver. Officer characteristics include race, gender and years of experience.

Additionally, we have information on whether the driver received a citation, and, if the driver was cited, what they were cited for. We categorize citations into three categories: nonmoving, moving and felony. Nonmoving citations include expired licenses, insurance, and vehicle registration. Failure to signal, excess speed, no seat belt and other violations are defined as moving violations. Felony infractions include driving under the influence, vehicular manslaughter, criminal negligent homicide and other similar charges. We relied on standard legal definitions, fine schedules, and potential judicial consequences as tools to categorize citations

[1] In some cases, a driver involved in an accident is cited for more than one infraction. In these cases, the number of times the officer-driver pair appears in our dataset corresponds to the number of citations received by the driver.

into one of the three categories. For example, the breach of a traffic law that occurs while a vehicle is in motion is defined as a moving violation. Fine schedules and judicial consequences were used to distinguish between infractions viewed in the criminal justice system as more serious moving violations. A citation for vehicular manslaughter or driving under the influence clearly fits the definition of a moving violation as these offenses are likely to occur while the vehicle is in motion; however, drivers convicted of such charges may be sentenced to time in jail and accrue thousands of dollars in fines. For comparison, drivers cited for speeding - one of the most commonly seen moving violations in the data – are typically charged a fine not to exceed a few hundred dollars[2].

Due to the nature of our research question, we must have information on the gender of the responding officer. This necessary requirement reduces our sample size to roughly 655,000 observations – meaning that for over 165,000 observations, information on the gender of the officer is missing. We lose an additional 150,000 observations due to missing data on location of accident, citation received and other driver and officer characteristics such as age and race.

Overall, our analysis focus on 492,624 observations. Summary statistics are provided in Table 1. White drivers make up 66% of our sample, 24% Hispanic and 10% black. Similarly, 70% of officers are white, 22% Hispanic and 8% black. Overall, 51% of drivers are cited; female drivers are cited 48% of the time and male drivers are cited 53% of the time. Conditional on receiving a citation, 11% of drivers are cited for a felony infraction, 24% for a nonmoving violation, and the remaining 65% are cited for a moving violation. 35% of accidents involve only one vehicle, 47% are two vehicle accidents and the remaining 18% involve 3 or more vehicles. Female drivers make up 34% of our sample. Meanwhile only 4% of officers are female.

[2] Speeding fines vary by county and alleged speed of the driver relative to the posted speed limit.

When considering the importance and consequences of the decisions made by police officers, this gender disparity is huge. With emerging evidence of own-gender/own-race preferences and racial discrimination in law enforcement and, more broadly, the judicial system (West 2018, Hoekstra 2018, Fryer 2016), police departments actively make efforts to ensure the racial composition of officers more closely reflect the racial composition of the neighborhoods they serve. If gender discrimination does exist - positively or negatively – the gender disparity of the police force could be a real social problem.

CHAPTER IV

IDENTIFICATION STRATEGY

One of the major difficulties with attempting to identify bias using police data is the fact that a driver-officer interaction is not exogenous. In other words, an officer chooses whom to pull over and whom not to pull over. This means that by relying only on traffic stop data then we are observing only the interactions that occurred and not the interactions that did not occur. Our dataset, which is composed of motor vehicle accidents as opposed to traffic stops, allows us to circumvent this issue of selection. Intuitively, we think this interaction is as good-as-random, after all when an accident occurs the nearest available officer is likely to be dispatched to the scene of the accident. Unlike in the setting of traffic stops where the officer "chooses" who to pull over, the choice of the interaction in this setting is driven by the random nature of traffic accidents.

Therefore, the first goal in this analysis is to show that the gender of the officer is exogenous to the gender of the driver. Similarly stated, we test that the gender of the responding officer is not correlated to the gender of the driver. We do this by running the simple OLS regression below:

$$Officer\ gender_j = driver\ gender_i + \varepsilon \quad (1)$$

The results from the exogeneity test are displayed in Appendix Table 2. Our first specification is the model shown above. We then add block group fixed effects, crash level controls and driver controls. The block group fixed effects is a set of control that essentially allows for variation in the gender composition of the police force. Crash level controls include weather, road and light conditions, month, and day of the week.

The second part of this analysis deals with our research our research question of interest: Are officers more lenient towards drivers of the same gender relative to drivers of the opposite gender. We use a differences-in-differences identification strategy to test whether officers discriminate based on gender. This strategy allows for male and female drivers to have different levels of "true" culpability in an accident and for male and female officers to have different propensities to issue citations. After controlling for these factors, we want to test if the unique cross-gender pairing of officer and driver results in different citation rates.

Our model is as follows:

$$Cited_{ij} = \beta * femaledriver_i + \gamma * femaleofficer_j + \delta * femaledriver * maleofficer + \varepsilon \qquad (2)$$

where,

Cited is a binary variable that takes on the value of 1 if the driver involved in the accident received a citation and 0 otherwise. β captures the differences in propensity to commit an infraction between male and female drivers and γ captures the differences in propensity to issue citations among male and female officers. δ is our parameter of interest; it captures how much more or less likely a female driver is to be cited if she encounters a male officer than if she encounters a female officer. A $\delta>0$ indicates that if a female driver is randomly assigned to a male officer, she is more likely to receive a citation than if she was randomly assigned a female officer. Similarly, a $\delta<0$ would suggest that if a male officer responds to the scene of an accident of a female driver, she is less likely to receive a citation than if a female officer were to have responded.

The results from this analysis are shown in Appendix Table 3. Column (1) is equation 2 without any controls, (2) adds location fixed effects, (3) includes crash level and driver controls.

CHAPTER V

RESULTS

Exogeneity Test

As discussed above, our first goal in this paper is to establish that the gender of the responding officer is not correlated to the gender of the driver. The results from equation (1) are shown in Appendix Table 2. The first column, our basic model without any controls, actually shows that the gender of the driver predicts the gender of the responding officer. However, after we control for the location, and therefore the gender composition of the police force, we find the gender of the responding officer is as good as random. Unlike in traffic stops, a setting commonly used by researchers to test for police discrimination, we found an environment that provides us as good-as-random officer-driver gender pairings that allows us to make credible causal inferences.

Gender Bias

All citations

Our question of interest in this paper is whether the probability of being cited is different when we observe a unique interaction between a male officer and a female driver, after controlling for the different propensities to commit infractions by the gender of the driver and the different propensities to issue citations by the gender of the officer. These results are shown in Appendix Table 3.

We find that, across all citations, female drivers are less likely to receive a citation than male drivers. This could simply be because males and females have inherent differences in driving behavior. We also find that female officers are slightly more likely to issue citations than

male officers. But more importantly, we find that when a male officer responds to a crash where the driver is female, the probability of being cited is not statistically different from zero. This means that we can rule out discrimination based on gender *against* female drivers and we can rule out discrimination based on gender *in preference* of female drivers after controlling for location, crash characteristics and driver characteristics.

By Citation Severity

However, not every infraction is the same. It is possible that officers treat citations of varying levels of severity differently. It could be that a driver that is guilty of a minor infraction, i.e. having an expired license, is treated differently than a driver that is under suspicion for a more serious offense, i.e. DWI. It could also be that depending on the severity of the offense, officers may choose to exercise a greater level of leniency. Based on this intuition, we decide to run a separate analysis based on the different levels of citations issued. We classify all citations in our dataset into one of three categories: moving, nonmoving and felony. Moving violations includes infractions such as speeding, failure to signal a lane change, failure to yield among others. Nonmoving violations include citations for not expired registration, expired driver's license, not having insurance. The last, and the more serious of the three, are the felony violations. Citations in this category include vehicular manslaughter, vehicular homicide and DWI.

The results from this analysis are shown in Appendix Table 4. Again, we find that female drivers are less likely than male drivers to be cited for each of the three offense categories and that female officers are more likely than male officers to cite drivers than male officers. We also find that when a male officer responds to the scene of a crash where the driver is female, the probability of being cited is not statistically different from zero for felony and nonmoving

violations. We interpret this as evidence that there is no sign of gender discrimination both *in preference of* and *against* female drivers for nonmoving and felony citations. We do find that for moving violations, infractions like speeding, female drivers are 1.6% less likely to receive a citation than a male driver when a male officer responds to the scene of the accident. This relationship is statistically significant at the 5% level. Given our mean citation rate of 34%, this is equivalently stated as female drivers are 5 percentage points less likely to be cited for a moving violation than a male driver when a male officer responds to the scene of the accident.

Moving Violations

We further analyze the moving violations for heterogeneous effects by the age of the driver. Our sample is broken up into four different age groups. We show the results in Appendix Table 5. Here we see that the results are mainly driven by differential in treatment of younger drivers. To be more specific, we see that a female driver between the ages of 18 and 20 is 3.9% less likely to be cited when the investigating officer is male. Similarly, a female between the ages of 21-29 is 3.28% less likely to receive a moving violation and a female between the ages of 30 and 50 is 2.4% less likely to be cited for a moving infraction. Notice the probability of being cited becomes less negative and closer to zero as age increases. In fact, for a woman above the age of 50, the probability of being cited when a male officer – female driver pairing occurs. The data do not allow us to make any conclusions as to why this may be. What the data show, however, is that there seems to be evidence of a relative bias by male officers. In other words, we cannot say whether we find this effect because male officers are too lenient towards young female drivers or because they are too harsh towards young male drivers.

CHAPTER VI

CONCLUSION

This paper seeks to answer whether evidence of gender discrimination exists in law enforcement. Unlike in traffic accidents where an officer-driver interaction could suffer from issues of endogeneity, we exploit a setting that provides as good-as-random officer-driver gender pairings. Using data on motor vehicle accidents between 2006 and 2012, we use a differences – in – differences identification strategy that allows for both heterogeneity by gender in the officers propensity to issue citations and the drivers propensity to commit an infraction. This method, combined with the demonstrably exogenous officer-driver interactions, allows us to make credible causal inference interpretations of gender discrimination in this setting.

Based on this analysis, we can rule out large amounts of gender discrimination both in preference of and against female drivers in most cases. We find heterogeneous effects by citation type; more specifically not finding any evidence of gender discrimination for nonmoving and felony violations. For moving violations, we find statistically significant levels of gender discrimination. We further find that this effect is mainly driven by drivers under the age of 50.

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APPENDIX

Table 1: Summary Statistics

	Mean
Male Officer	.9581
Male Driver	.6515
Any Citation	.5135
Moving Citation	.3383
Nonmoving Citation	.1193
Felony Citation	.0559
Observations	492624

Table 2: Is gender of responding officer correlated to gender of driver?

	(1)	(2)	(3)	(4)
Male Officer				
Female Driver	-0.00166***	-0.000749	-0.000749	-0.000798
	(0.0006)	(0.0006)	(0.0008)	(0.0008)
Block Group FE	No	Yes	Yes	Yes
Crash Controls	No	No	No	Yes
Observations	492624	492624	492624	492624

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In models 3 and 4 standard errors are clustered at the officer level

Table 3: Gender Bias Across All Citations

	(1)	(2)	(3)
Outcome Variable: Cited			
Female Driver	-0.0517***	-0.0462***	-0.0527***
	(0.0072)	(0.0074)	(0.0070)
Female Officer	0.00273	0.00138	0.000125
	(0.0094)	(0.0089)	(0.0087)
Male Officer·Female Driver	-0.00947	-0.00963	-0.0102
	(0.0075)	(0.0076)	(0.0072)
Block Group FE	Yes	Yes	Yes
Crash Controls	No	Yes	Yes
Driver Controls	No	No	Yes
Observations	492624	492624	492624

Standard errors are clustered at the officer level * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Gender Bias by Citation Type

	(1) Moving	(2) Nonmoving	(3) Felony
Female Driver	0.0052	-0.0284***	-0.0296***
	(0.0063)	(0.0063)	(0.0038)
Female Officer	-0.0073	0.0018	0.0056*
	(0.0066)	(0.0072)	(0.0032)
Male Officer·Female Driver	-0.0159**	0.0016	0.0041
	(0.0064)	(0.0064)	(0.0038)
Observations	492624	492624	492624

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Moving Citation by Age Group

	(1) 18-20	(2) 21-29	(3) 30-50	(4) >50
Female Driver	0.0179	0.0111	0.0127	-0.0149
	(0.0202)	(0.0138)	(0.0099)	(0.0137)
Female Officer	-0.0062	-0.0174*	-0.0080	-0.0036
	(0.0126)	(0.0103)	(0.0087)	(0.0083)
Male Officer ·Female Driver	-0.0399*	-0.0328**	-0.0241**	0.0195
	(0.0206)	(0.0141)	(0.0101)	(0.0140)
Observations	56268	118552	178314	111911

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$